Trend Study 16C-29-04

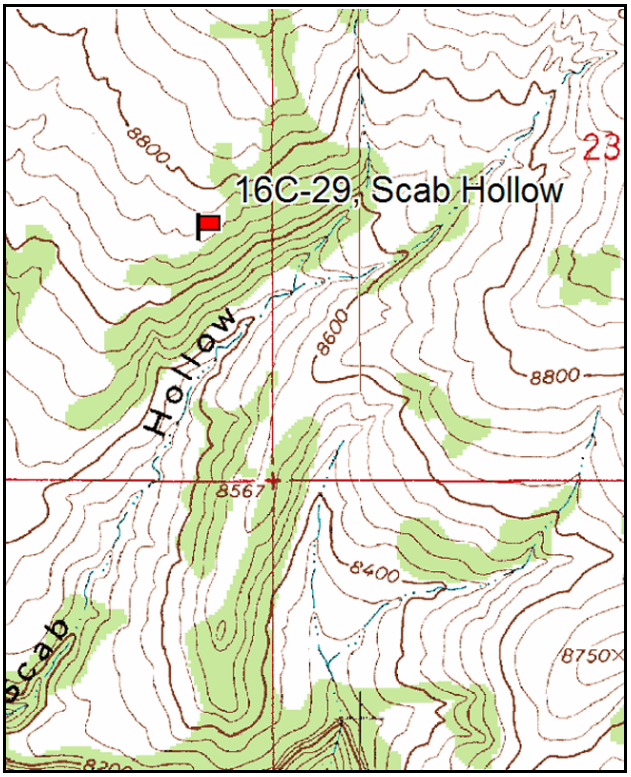
Study site name: Scab Hollow . Vegetation type: Curlleaf Mtn Mahogany .

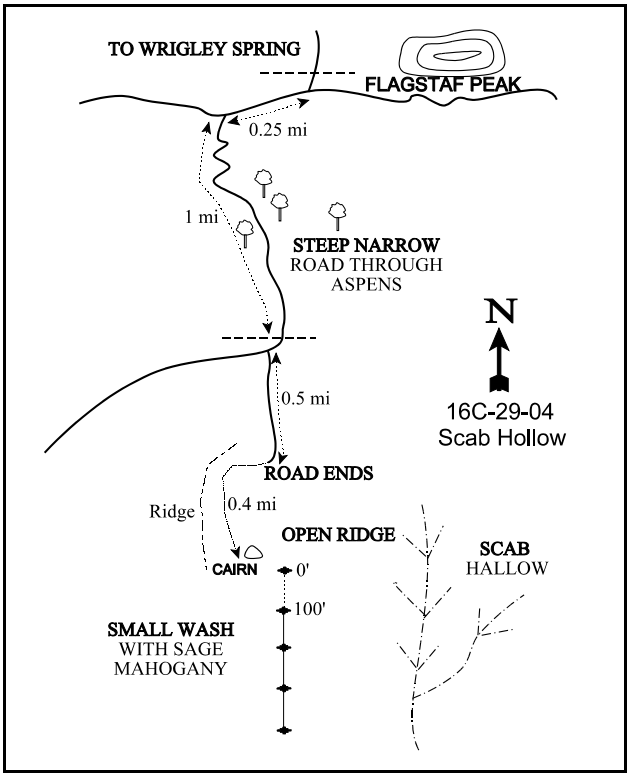
Compass bearing: frequency baseline 183 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Forest Service boundary up Ferron Canyon, travel 7.8 miles to Wrigley Reservoir. From Wrigley Springs Reservoir on F.S. Road #43, continue on the main road SW to Wrigley Spring. Proceed south 0.9 miles to a T-intersection. Turn right toward Twelve Mile Flat. Go 0.25 miles and turn left onto a dirt road (F.S. Road #274). Go 1.0 miles down through the aspens on the steep narrow road to a fence. Just past the fence, bear left at a faint fork. Continue 0.5 miles to the end of the road. It is possible to continue driving down the ridge. Turn right down the small hill then go down the ridge bearing left through the clearings for .4 miles to the SE edge of the small, open ridge above Scab Hollow. There is a rock cairn along the edge to mark the study site. From the cairn, it is 15 feet SE to the 0-foot baseline stake, identified by a red browse tag #9027 on the short fencepost. The study runs down across the slope.





Map Name: Flagstaff Peak

Diagrammatic Sketch

Township 20S ,Range 5E , Section 22

GPS: NAD 27, UTM 12S 4322385 N, 470771 E

DISCUSSION

Scab Hollow - Trend Study No. 16C-29

The Scab Hollow study is located in the upper end of Scab Hollow, a small drainage on the north side of Muddy Creek. The study samples a curlleaf mountain mahogany and grass slope at 8,700 feet. The site has south exposure with a moderate slope of 23-25%. Further up the slope are some large, old individuals of curlleaf mountain mahogany. The area is considered important elk winter range. Little elk sign was observed in 1994, but pellet group data from 1999 estimated 10 deer, 61 elk, and 2 cow days use/acre (25 ddu/ha, 151 edu/ha, and 5 cdu/ha). Pellet group data from 2004 estimated 88 elk and less than 1 cow days use/acre (218 edu/ha and 2 cdu/ha). Cow use was from last summer. Cattle graze this Forest Service land in summer as part of the Ferron allotment.

The soil is derived from a limestone parent material. It has a clay texture with a slightly alkaline pH (7.6). The soil is rocky and loose in the surface layer and easily disturbed. It is moderately deep with an effective rooting depth estimated at almost 16 inches. Phosphorus is limited at only 2.6 ppm. Values less than 10 ppm can limit normal plant growth and development. Rock in the profile consists mainly of gravel, although some large rocks are present in the profile and on the surface. Many of the rocks in the profile have a white coating of calcium carbonate. Open areas have high amounts of pavement cover. Erosion potential is high, yet current erosion is moderate. There is evidence of soil movement, pedestaling, and terracing on the steeper slopes. There are no active gullies on the site and grasses provide good overall soil protection.

The slope is dominated by a mature stand of curlleaf mountain mahogany that is moderately to heavily hedged. Some of the mature plants are large trees which are highlined and mostly unavailable to browsing. Average height of mature curlleaf was 6.5 feet in 1994, 7 feet in 1999, and almost 8 feet in 2004. Overhead canopy cover was estimated at 14% in 1999 and 15% in 2004. None of the plants sampled in 1994 or 1999 were decadent, but in 2004 10% were classified as decadent. Many of the mature plants contained numerous dead branches which is normal for curlleaf mountain mahogany. Young plants are common. Curlleaf mountain mahogany provided 42% of the browse cover in 1994, 63% in 1999, and 54% in 2004.

There are pockets of mountain big sagebrush and black sagebrush on the ridge which show light to moderate hedging. Other browse species which occur infrequently include rabbitbrush, buckwheat, broom snakeweed, Oregon grape, snowberry, and gray horsebrush. A few scattered pinyon and juniper trees occur on the site.

The herbaceous understory is abundant and provides the majority of the vegetation cover on the site. The dominant grass species is Salina wildrye which made up 93% of the herbaceous cover in 1994, 72% by 1999, and 81% in 2004. There is also some bluebunch wheatgrass and Indian ricegrass present in small numbers. A variety of forbs are present on the site but all species combined made up only 5% of the herbaceous cover in 2004. This is a decrease from contributing 23% of the herbaceous cover in 1999. Nested frequency decreased as well. However two species, annual stickseed and bastard toadflax , are the most common.

1994 TREND ASSESSMENT

Litter cover has decreased, while relative percent bare ground has only increased from 24% to 28%. Most of the ground cover is provided by Salina wildrye, which is a slightly rhizomatous bunchgrass, and often leaves bare interspaces between individual plants. These minor changes do not warrant changes in trend. Therefore, trend for soil is stable. Curlleaf mountain mahogany is the key browse on this site. It is a vigorous stand with a small, but expanding, population. The increase in density of curlleaf mahogany and changes in density of other species are mostly due to the lengthening of the baseline in 1994 in order to sample a larger area. Browse trend is stable. Here again, herbaceous understory trend is considered stable, because sum of nested frequency for perennial grasses decreased slightly, but not enough to get a change in trend. The sum of nested

frequency for perennial forbs decreased greatly, but they only contribute to only 3% of the herbaceous cover. The Desirable Components Index (see methods) rated this site as fair with a score of 67 due to low shrub cover, several young shrubs, and a excellent grass cover, although forb cover is minimal.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)
winter range condition (DC Index) - 67 (fair) Mountain brush type

1999 TREND ASSESSMENT

Trend for soil stable for the slight improvement in relative percent bare ground has not improved enough to warrant a change in trend. Relative percent cover of bare ground has declined from 28% to 19% while percent cover of litter has increased slightly. There is some erosion occurring and rock-pavement relative cover increased from 26% to 31% which would indicate some soil loss. Terracing and pedestaling are common on the steeper slopes. However, there are no active gullies on site and it appears that soil movement is localized. Trend for the key browse species, curlleaf mountain mahogany, is considered stable. The stand has a balanced population of young and mature plants which display moderate to heavy use. Vigor is normal and there were no decadent plants sampled. Trend for the herbaceous understory is stable for grasses and up slightly for forbs. Nested frequency of the dominant grass, Salina wildrye, has remained stable since 1988. Other grasses are infrequent. Sum of nested frequency of perennial forbs has increased and cover has gone up from 0.6% in 1994 to almost 6% in 1999. Sixty six percent of the forb cover comes from bastard toadflax. Overall herbaceous trend is still considered stable. The Desirable Components Index rated this site as good with a score of 79 due to moderate shrub cover, low decadence, and many young shrubs. Grass and forb cover is also moderately high.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)
winter range condition (DC Index) - 79 (good) Mountain brush type

2004 TREND ASSESSMENT

Trend for soils is stable. Protective cover has slightly gone up while bare ground cover increased from 22% in 1999 to 30% in 2004, which was similar to 1994 estimates. There is some erosion occurring, but rock-pavement cover has decreased from 37% in 1999 to 31% in 2004. Trend for key browse, curlleaf mountain mahogany, is stable. Percent decadence slightly increased to 60 plants/acre, but young recruitment is still good. Utilization has increased to heavy use, but vigor remains good, most mature plants are highlined. Trend for herbaceous understory is stable. Nested frequency for Salina wildrye has remained stable since 1988. Other grasses remain infrequent. Forbs continue to provide minimal cover. Forbs nested frequency has decreased from 1999 estimates, most lightly due to drought conditions. Over half of forb cover came from annual stickseed and the other half from bastard toadflax. The Desirable Components Index rated this site as fair with a score of 67 due to moderate shrub cover, low decadence, and many young shrubs. Grass cover is still high, but forb cover decrease.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)
winter range condition (DC Index) - 67 (fair) Mountain brush type

HERBACEOUS TRENDS --
Management unit 16C, Study no: 29

Type	Species	Nested Frequency				Average Cover %		
		'88	'94	'99	'04	'94	'99	'04
G	Agropyron spicatum	a-	a-	a2	b24	-	.02	.76
G	Agropyron trachycaulum	b18	a5	ab21	a-	.18	.65	-
G	Carex spp.	4	-	2	-	-	.03	-
G	Elymus salina	286	276	268	262	20.00	17.11	15.33
G	Oryzopsis hymenoides	27	33	19	15	.84	.37	1.11
G	Poa spp.	3	-	-	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		338	314	312	301	21.03	18.19	17.20
Total for Grasses		338	314	312	301	21.03	18.19	17.20
F	Astragalus convallarius	3	-	-	3	-	-	.00
F	Castilleja linariaefolia	3	-	2	-	-	.03	-
F	Calochortus nuttallii	1	-	3	-	-	.00	-
F	Chaenactis douglasii	a3	a-	b20	a-	-	.25	-
F	Chenopodium fremontii (a)	-	a-	a-	b11	-	-	.02
F	Chenopodium leptophyllum(a)	-	a-	a-	b11	-	-	.03
F	Comandra pallida	bc61	a25	c82	ab48	.06	3.60	.46
F	Cymopterus spp.	-	-	1	-	-	.00	-
F	Eriogonum alatum	-	1	7	4	.00	.06	.01
F	Erigeron eatonii	-	-	2	-	-	.00	-
F	Erigeron spp.	2	-	-	-	-	-	-
F	Erigeron pumilus	-	-	3	3	-	.03	.00
F	Hymenopappus filifolius	8	5	-	-	.01	-	-
F	Hymenoxys richardsonii	12	2	3	8	.03	.18	.30
F	Lappula occidentalis (a)	-	a2	a-	b17	.00	-	.72
F	Lesquerella spp.	b28	ab4	ab8	a-	.01	.10	-
F	Linum lewisii	-	4	3	-	.03	.04	-
F	Lithospermum ruderale	3	-	-	-	-	-	-
F	Machaeranthera canescens	9	-	3	3	-	.00	.00
F	Madia glomerata (a)	-	-	-	-	-	-	.03
F	Machaeranthera grindelioides	b51	a21	a20	a4	.32	.67	.07

Type	Species	Nested Frequency				Average Cover %		
		'88	'94	'99	'04	'94	'99	'04
F	Penstemon caespitosus	6	1	8	2	.00	.04	.00
F	Petradoria pumila	8	4	9	-	.06	.33	-
F	Phlox hoodii	$_{b}$14	$_{b}$6	$_{b}$4	$_{a}$-	.03	.06	-
F	Senecio multilobatus	1	-	-	-	-	-	-
F	Tragopogon dubius	-	-	2	3	-	.03	.00
Total for Annual Forbs		0	2	0	39	0.00	0	0.81
Total for Perennial Forbs		213	73	180	78	0.58	5.47	0.87
Total for Forbs		213	75	180	117	0.59	5.47	1.68

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 16C, Study no: 29

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Amelanchier utahensis	0	0	1	-	-	-
B	Artemisia nova	3	3	7	.30	.18	.44
B	Artemisia tridentata vaseyana	2	2	0	-	.00	-
B	Cercocarpus ledifolius	19	22	20	3.09	5.56	5.12
B	Chrysothamnus viscidiflorus viscidiflorus	1	2	4	-	.06	.03
B	Eriogonum corymbosum	18	9	13	.52	.48	.24
B	Gutierrezia sarothrae	13	20	28	.05	.44	1.06
B	Juniperus scopulorum	0	1	1	2.25	2.00	2.23
B	Mahonia repens	10	11	13	.04	.06	.18
B	Pediocactus simpsonii	0	0	1	-	-	-
B	Pinus flexilis	0	1	0	.98	-	-
B	Symphoricarpos oreophilus	2	1	4	-	-	.00
B	Tetradymia canescens	2	2	2	.15	.03	.15
Total for Browse		70	74	94	7.40	8.84	9.48

CANOPY COVER, LINE INTERCEPT --
Management unit 16C, Study no: 29

Species	Percent Cover	
	'99	'04
Artemisia nova	-	.58
Cercocarpus ledifolius	13.60	15.25
Eriogonum corymbosum	-	.03
Gutierrezia sarothrae	-	1.85
Juniperus scopulorum	2.79	3.20

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 16C, Study no: 29

Species	Average leader growth (in)
	'04
Cercocarpus ledifolius	3.6

POINT-QUARTER TREE DATA --
Management unit 16C, Study no: 29

Species	Trees per Acre	
	'99	'04
Cercocarpus ledifolius	93	68

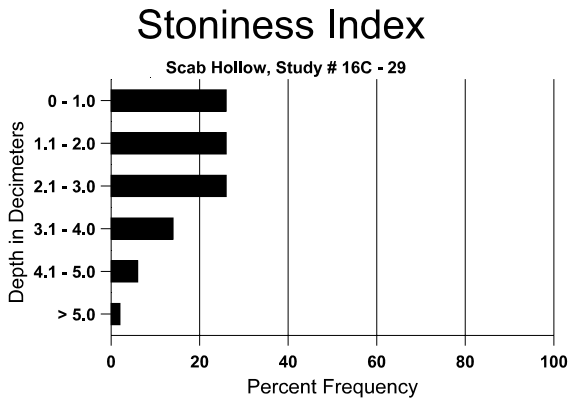
Average diameter (in)	
'99	'04
9.7	7.8

BASIC COVER --
Management unit 16C, Study no: 29

Cover Type	Average Cover %			
	'88	'94	'99	'04
Vegetation	5.50	29.47	30.78	29.20
Rock	6.50	19.67	16.20	14.73
Pavement	13.25	9.30	20.36	15.73
Litter	51.00	22.71	28.31	22.69
Cryptogams	0	.00	.04	.24
Bare Ground	23.75	30.78	21.73	30.37

SOIL ANALYSIS DATA --
Management unit 16C, Study no: 29, Study Name: Scab Hollow

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
15.7	51.7 (12.9)	7.6	34.0	24.2	41.8	2.9	2.3	89.6	0.6



PELLET GROUP DATA --
Management unit 16C, Study no: 29

Type	Quadrat Frequency		
	'94	'99	'04
Rabbit	27	15	10
Elk	11	29	34
Deer	7	6	5
Cattle	1	-	-

Days use per acre (ha)	
'99	'04
-	-
61 (151)	88 (218)
10 (25)	-
2 (5)	1 (2)

BROWSE CHARACTERISTICS --
Management unit 16C, Study no: 29

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**20**	-	20	-	-	-	0	0	-	-	0	21/22
Artemisia nova												
88	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**200**	-	120	60	20	-	60	0	10	10	10	10/22
99	**140**	-	-	120	20	60	57	43	14	-	0	8/19
04	**320**	-	60	200	60	-	0	0	19	13	13	8/21
Artemisia tridentata vaseyana												
88	**66**	-	-	66	-	-	0	0	0	-	0	12/15
94	**40**	-	-	40	-	-	50	0	0	-	0	6/10
99	**40**	-	-	20	20	-	0	50	50	-	0	15/17
04	**0**	-	-	-	-	-	0	0	0	-	0	25/22

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Cercocarpus ledifolius												
88	**165**	33	66	66	33	-	20	0	20	-	0	119/116
94	**580**	20	300	280	-	40	17	0	0	-	0	77/67
99	**660**	80	340	320	-	-	24	12	0	-	0	84/78
04	**620**	20	280	280	60	20	35	52	10	3	3	66/61
Chrysothamnus viscidiflorus viscidiflorus												
88	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**20**	-	-	20	-	-	100	0	0	-	0	7/11
99	**40**	-	-	20	20	-	100	0	50	-	0	7/9
04	**160**	-	20	140	-	-	0	0	0	-	0	10/15
Eriogonum corymbosum												
88	**66**	-	33	-	33	-	0	0	50	-	0	-/-
94	**920**	-	360	520	40	-	17	9	4	4	4	10/13
99	**420**	20	-	380	40	-	29	0	10	-	0	7/9
04	**380**	-	80	240	60	-	5	16	16	-	0	5/9
Gutierrezia sarothrae												
88	**1499**	-	133	1366	-	-	0	0	0	-	0	8/10
94	**380**	-	160	200	20	20	0	0	5	5	5	11/11
99	**1720**	-	200	1500	20	-	0	0	1	-	0	6/8
04	**1900**	-	140	1760	-	-	0	0	0	-	0	7/8
Juniperus scopulorum												
88	**33**	-	33	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**20**	-	-	20	-	20	0	0	-	-	0	-/-
04	**20**	-	-	20	-	-	0	0	-	-	0	-/-
Mahonia repens												
88	**899**	-	866	-	33	-	0	0	4	-	0	-/-
94	**580**	80	380	200	-	-	0	0	0	-	0	3/4
99	**900**	20	520	380	-	-	0	0	0	-	0	2/4
04	**600**	-	20	580	-	-	0	0	0	-	0	3/4
Pediocactus simpsonii												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**20**	-	-	20	-	-	0	0	-	-	0	-/-

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Pinus edulis												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**20**	-	20	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Symphoricarpos oreophilus												
88	**66**	-	66	-	-	-	0	0	0	-	0	-/-
94	**120**	-	80	40	-	-	0	33	0	-	0	7/13
99	**40**	40	20	20	-	-	0	0	0	-	0	7/11
04	**160**	-	20	120	20	-	0	0	13	-	0	6/11
Tetradymia canescens												
88	**66**	33	33	33	-	-	0	0	0	-	0	8/11
94	**80**	-	-	80	-	-	25	0	0	-	0	7/13
99	**40**	-	-	20	20	-	50	0	50	-	0	7/18
04	**40**	-	-	40	-	-	50	0	0	-	0	9/21